

THE DEVELOPMENT OF ANTI-LITTER BEHAVIOR IN A FOREST CAMPGROUND¹

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This study evaluates the effectiveness of an incentive procedure designed to induce litter collection in a large forest campground. Children in the campground were offered their choice of a variety of reinforcers for picking up and properly disposing of litter. The procedure resulted in a sharp decline in four types of litter planted in the campground.

Littering in campgrounds and other natural environment areas frequented by the public is commonly defined as inappropriate behavior, yet the accumulation of litter in such areas is a persistent and expensive problem. Keep America Beautiful (1970) reported that cleaning up and combatting litter along highways and in forests, parks, beaches, and other public areas cost United States taxpayers about \$500 million annually. During 1971, cleanup after campers on the National Forests alone cost \$22 million, a 12% increase over the previous year.

It is surprising, considering the magnitude and costs of litter, that there has not been more scientific effort focused on the litter problem. One national survey indicated that men litter twice as much as women, and young adults litter twice as much as the middle-aged and three times as much as those 50 years or older (Keep America Beautiful, 1968). Those persons admitting to littering said they had done so for reasons of carelessness, laziness, indifference, or because trash receptacles were not available.

Commercial areas are reported to have twice as much litter as residential areas, the composition of litter being 50% paper, 20% paper packages, 12% beer and soft drink cans, and the remainder bottles and broken glass (Continental Can Co., 1970). Another study found that handouts to university students were more often carelessly discarded under already littered than under unlittered conditions (Heberlein, 1971). This extensive study also concluded that knowledge of formal sanctions and the existence of highway litter control signs and litter barrels had no impact on littering, and that there was no relationship between anti-litter attitudes and littering behavior. A study of anti-litter messages indicated that handout leaflets were accepted and read by only one-third of the campers for which they were intended (Marler, 1971). A study in public recreation areas noted indifference and apathy by bystanders to observed littering acts and an increase in littering as the day for departure from a campsite approached (Campbell, Hendee, and Clark, 1968; Clark, Hendee, and Campbell, 1971). Additional descriptive research suggests that local residents were less sensitive to the litter problem and complied less to litter regulations than did visitors from far away (McCool and Merriam, 1970).

These studies offer limited potential for changing the behavior of offenders and, hence, little promise for eliminating the problem.

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Similarly, a host of journalistic analyses of the littering problem and other conjecture contribute little other than to draw attention to the litter problem and to prompt the outrage of interested parties (Bennett, 1970; Frome, 1969; Tinker, 1969). Inevitably, the result is a renewal of more traditional efforts to control litter.

Efforts to combat the litter problem include legal proscription, anti-litter propaganda, posted messages, and plentiful garbage cans. These traditional techniques proved largely ineffective in a previous study of litter behavior in movie theaters, an environment where littering is both common and accepted (Burgess, *et al.*, 1971). It was found, however, that the level of litter could be substantially reduced and almost eliminated in kiddie matinees by offering incentives for picking up litter to the children in attendance. The present study was conducted in a forest campground to determine if a similar procedure would have a comparable effect in a natural environment setting.

METHOD

Subjects and Setting

Twenty-six children, ranging in age from 6 to 14 yr, were selected from seven families that were camping in the area. The campground chosen for the study covers over 100 acres in the Wenatchee National Forest and attracts large numbers of people, as many as 1000 at a time. The campground complex lies generally parallel to a lake for more than one mile and contains several different environments offering a variety of activities. The following areas or campground environments were used in the study: three camping areas, three day-use areas with picnic facilities and some playground equipment, a beach along the lake, the main road through the campground, and a nature trail. (See Figure 1.)

Procedure

The study extended over a period of two successive August weekends. The first weekend was

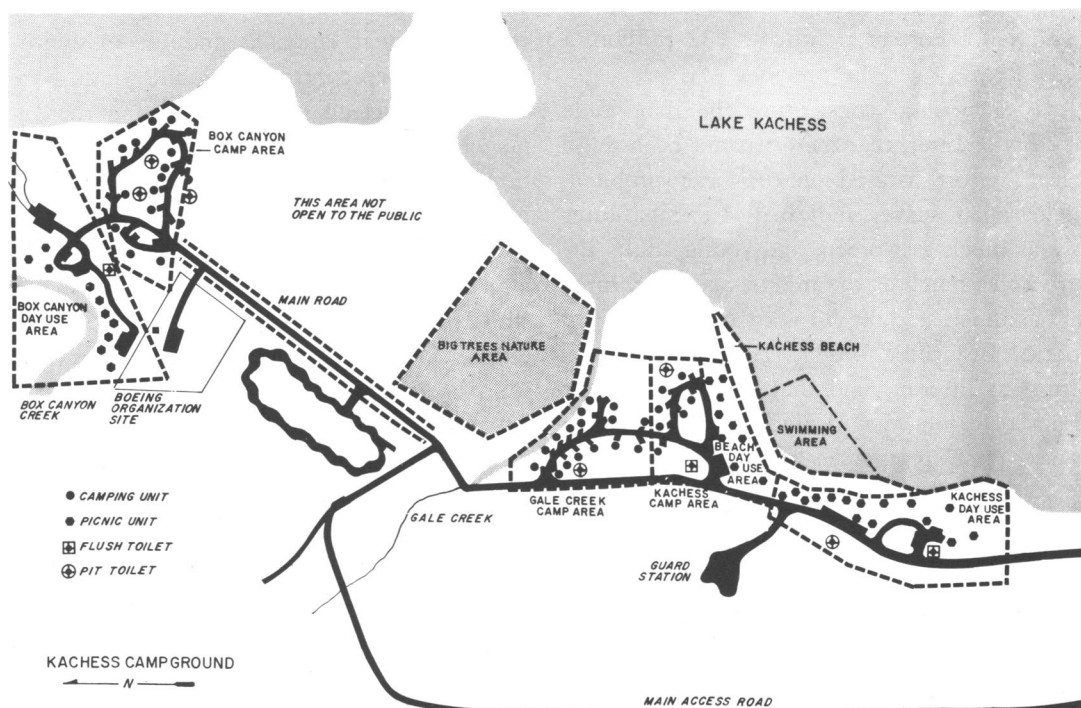


Fig. 1. Lake Kachess Campground. The areas studied are outlined by the dotted lines.

used to obtain baseline measures of the amount of litter under normal conditions. On Saturday of the second weekend, incentives were provided for picking up litter.

Before the first weekend, the campground was divided into separate areas and well-defined routes were established for counting litter. All areas were counted "on foot" except for the main road (one-half mile), which was counted from a car.

The dependent variable measured was the number of pieces of planted litter found in the campground. Four types of litter were planted to provide a constant level on both weekends and to provide data on differences in the pickup of various types of litter. Planted litter included crushed brown paper bags, beverage cans, non-deposit bottles, and deposit bottles. On the Thursday and Friday preceding both weekends, each area was seeded with litter. Three to five pieces of each type of litter were placed in each area, depending on the size of the area. The location of each piece of litter was marked on a map so that it could be easily identified later. In total, 160 pieces of litter were planted in the campground on both weekends.

During each counting period, a team of two observers proceeded along the route. Each observer was responsible for a specific type of litter. For example, one observer might tally cans and non-deposit bottles while the other tallied paper bags, deposit bottles, and other types of "natural" litter not planted by the research staff. Whenever one observer would notice a piece of litter, he would point it out to the other at which time the appropriate tally was made on a set of hand-held six-bank counters.

Counting periods took approximately 1.5 to 2 hr to complete. Litter counts were taken on Thursday, Friday, Saturday, and Sunday beginning at 4:30 p.m. and on Monday morning after most people had left the campground. During the study periods, campground rangers cooperated by not picking up litter and by not encouraging others to do so.

At 10:00 a.m. Saturday morning of the sec-

ond weekend, one member of the research staff, in a Forest Service uniform, contacted seven families. The parents were informed that there was a litter problem in the campground, and they were asked if their children would be willing to help. The children were told that if they would help they could choose one of the following items: a Smokey Bear shoulder patch, a Junior Forest Ranger badge, a Smokey Bear comic book, a wooden ruler, a Keep Washington Green pin, or a small box of Chiclets gum. Each child was then given a large 30-gallon plastic bag and told in which general areas to look for litter, such as along the road, on the beach, in the picnic area, *etc.* No specific amount of litter was required. They were informed that they had all day for the project and that the Ranger would be back at 7:00 p.m. to pick up their bags and to give them their reward. This was the only contact made with the participants until that evening. Their efforts were not monitored nor were they encouraged at any time to do a better job or to look in any specific area.

The next day, Sunday, was treated like a standard baseline day with a litter count being taken to measure any additional litter pickup in the campground following the Saturday treatment, but without any additional planting of litter. The final count was taken, as for the first weekend, on Monday morning.

RESULTS

During the baseline period (Week 1), the litter count dropped from 160 on Thursday to 143 on Friday, to 87 on Saturday, to 63 on Sunday, and finally to 56 on Monday morning. The litter counts on Thursday and Friday of Week 2 are quite similar to those of the first week. On Thursday, the number of pieces was 160, and on Friday 145 remained. On Saturday morning, however, the proposal presented by the staff members to the selected families was, in each case, met with a great deal of enthusiasm by both parents and children. When the litter count was taken that evening, the number of pieces

of litter had dropped sharply to only 24 pieces. Eighteen of the remaining 24 pieces were picked up during the next two days.

Figure 2 shows the effects of baseline and incentive conditions on the four respective types of litter planted in the campground. For the baseline period, bags, cans, and non-deposit bottles were the items least likely to be picked up. During the incentive period, all four types of litter planted by the staff were picked up in approximately equal numbers. Whereas 22 cans, 21 bags, 10 non-deposit bottles, and three deposit bottles remained on the ground at the end of Week 1, only two cans, one bag, two non-deposit bottles, and one deposit bottle were left at the end of Week 2.

DISCUSSION

Incentive procedures designed to encourage picking up litter in a forest campground were as strikingly effective as those employed in an earlier study in movie theaters (Burgess, Clark,

and Hendee, 1971). The results suggest that the level of all types of litter can be markedly reduced by providing positive consequences contingent on picking up litter. Indeed, these results indicate that for litter with a built-in value, such as deposit bottles, nothing additional is needed to encourage their pick up. However, for other types of litter such as cans, bags, or non-deposit bottles, a reward of some type was needed to induce collection and disposal comparable to that of the deposit bottles.

It is interesting that the non-deposit bottles were picked up in greater quantity during baseline conditions than either the cans or bags, even though they also had no monetary value. This may be due to the fact that close inspection is required to differentiate between deposit and non-returnable bottles. Once a bottle is picked up, a person would probably be more apt to discard it properly than to throw it back on the ground, especially if other people were present. Indeed, such behavior was observed on several occasions. Thus, the mere similarity of the non-returnables

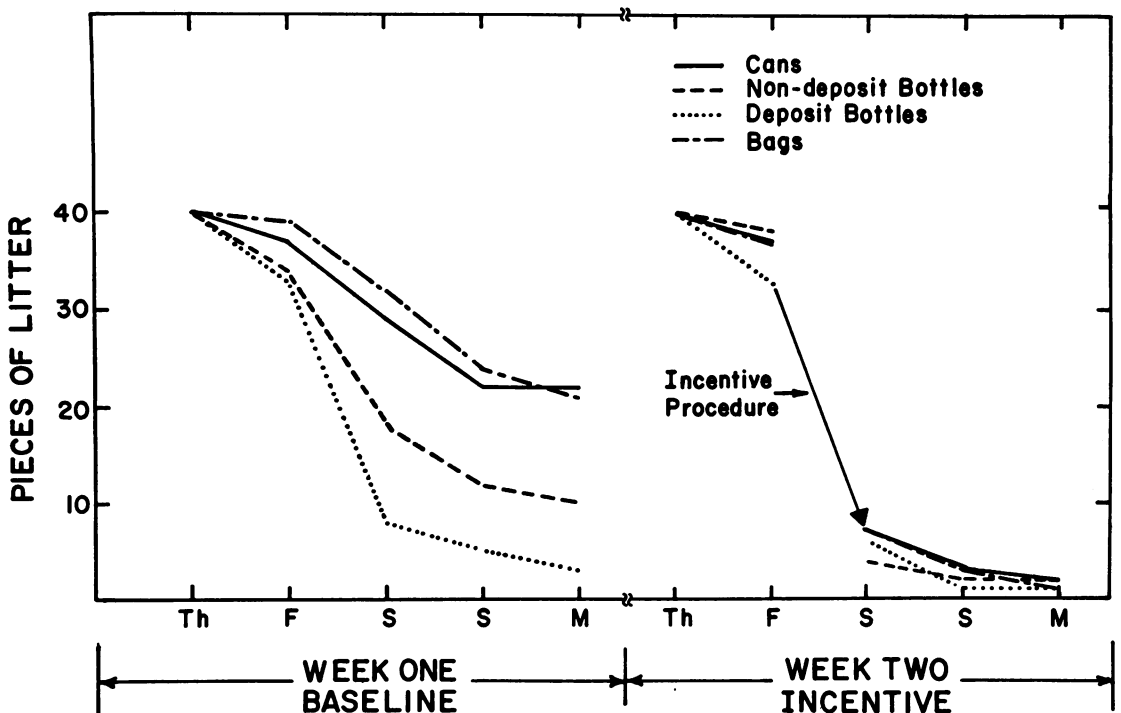


Fig. 2. Total pieces of planted litter in the campground by type during baseline and incentive conditions.

to the deposit bottles may account for their greater disappearance.

It should be noted that the number of pieces of each type of planted litter declined somewhat even during the baseline weekend, indicating that some citizens were picking up some litter. However, informal measures of the "natural" (*i.e.*, not planted by the authors) litter indicated that the overall amount of litter steadily increased throughout both weekends, except for a marked, but temporary, drop in natural litter on the day of the incentive procedure.

This suggests that although some litter may be collected in the absence of scheduled consequences, something additional must be done to retard the gradual accumulation of litter. Certainly, the extent of the litter problem in campgrounds and other natural environments supports this belief. When small incentives were offered to 26 children in exchange for a bag of litter, the level of both planted and natural litter in the campground dropped well below that which had been recorded during baseline conditions.

The quantity of litter collected by the children and its value to them were represented by 26 large bags of litter totalling 150 to 200 pounds which were exchanged for 21 Smokey Bear patches, four Junior Forest Ranger badges, and one Smokey Bear Fight Forest Fires pin. The litter completely filled the trunk and back seat of a full-sized American car. The incentives handed out cost approximately \$3.00, and two man-hours were required to implement the incentive system. Had the litter been collected by campground personnel, an equivalent job would have taken 16 to 20 hr and would have cost \$50 to \$60.

In conclusion, a variety of questions remains unanswered. For example, at which age group can such programs be most effectively focused? What types of incentives should be offered? How can the procedure be most effectively implemented? What are the costs and effectiveness

of this method compared with alternative litter control procedures? What types of litter are likely to be overlooked by participants? Further research is obviously necessary to answer these and related questions. However, this and the previous litter study in movie theaters suggest that scheduling positive consequences contingent on litter collection may be effective in combating the litter problem in a variety of environmental areas.

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